## AMENDMENTS TO THE CLAIMS

The following is a complete, marked-up listing of revised claims with a status identifier in parenthesis, underlined text indicating insertions, and strike through and/or double-bracketed text indicating deletions.

## Listing of the Claims:

1.      (Currently Amended) A method for counting cells or fat droplets in milk on-line during milking of a milking animal, wherein the steps of:

- flowing at least a portion of the milk as obtained during said milking of said milking animal through a measuring chamber;

- illuminating milk that flows through said measuring chamber;

- repeatedly recording about 1000 or more two-dimensional digital images of illuminated milk that flows through said measuring chamber, said two-dimensional digital images being recorded through a magnification lens system; and

- determining a somatic cell or fat droplet count score from said about 1000 or more two-dimensional images by means of digital image processing.

2.      (Previously Presented) The method of claim 1 wherein said at least portion of the milk flowed through said measuring chamber is free from toxic additives.

3.      (Previously Presented) The method of claim 1 wherein said at least portion of the milk flowed through said measuring chamber  is pure natural milk, optionally mixed with air, but free from any chemical additives.

4.     (Previously Presented) The method of claim 1 wherein said repeatedly recordings of two-dimensional digital images are performed to obtain a spatial resolution better than about 5 microns, in said two-dimensional digital images.

5.     (Previously Presented) The method of claim 1 wherein said measuring chamber has a dimension (t) smaller than about 100 microns, in a direction parallel with the optical axis  of said lens system during said repeated recordings.

6.     (Previously Presented) The method of claim 1 wherein said digital image processing includes the analysis of number, shape, size, structure, density and/or composition of particles found in each image as revealed by at least one of the reflection and transmission properties of the particles recorded spatially resolved by said camera system.

7.     (Previously Presented) The method of claim 1 wherein said digital image processing includes the use of neural networks.

8.     (Previously Presented) The method of  claim 1 wherein said at least portion of said milk, which is flowed through said measuring chamber, is lead away from a milk line  of a milking machine used to collect the milk as obtained during said milking of said milking animal.

9.     (Previously Presented) The method of claim 8 wherein said at least portion of said milk, which is lead away from said milk line, is brought back to said milk line or brought to a milk collecting container, after having been flowed through said measuring chamber.

10.    (Previously Presented) The method of  claim 1 wherein said at least portion of said milk is flowed through said measuring chamber  within a milk line  of a milking machine used to collect the milk as obtained during said milking of said milking animal.

11.    (Previously Presented) The method of  claim 1 wherein said milking of said milking animal is performed by an automated or semi-automated milking system, which comprises a plurality of teat cups , each of which being connected to a respective milk line , which milk lines in turn are connected to a container  via a claw and a single milk line, wherein, during milking of the teats of said milking animal, said plurality of teat cups are attached to the teats of the milking animal and vacuum  is supplied to said container to draw milk through said milk lines, said claw, said single milk line and into said container.

12.    (Previously Presented) The method of  claim 1 wherein said milking of said milking animal is performed by an automated or semi-automated milking system, which comprises a plurality of teat cups , each of which being connected to a respective milk line , which milk lines in turn are connected to a container  wherein, during milking of the teats of said milking animal, said plurality of teat cups are attached to the teats of the milking animal and vacuum  is supplied to said container to draw milk through said milk lines and into said container, wherein said milk is drawn in separate milk lines  all the way to said container.

13.    (Previously Presented) The method of claim 1 wherein said somatic cell or fat droplet count score is a count score of white cells.

14.    (Previously Presented) The method of  claim 11 wherein said container is

provided with a plurality of milk output lines; and said milk drawn through the milk lines and into said container is output through one of said plurality of milk output lines depending on said somatic cell or fat droplet count score.

15.    (Previously Presented) The method of claim 1 wherein a content of fat is estimated from said two-dimensional images by means of said digital imaging processing.

16.    (Previously Presented) The method of claim 15 wherein said content of fat is estimated from number and size of fat droplets in said two-dimensional images.

17.    (Previously Presented) The method of claim 12 wherein

- a measuring chamber is provided in each milk line;

- at least a portion of the milk drawn through the respective milk lines is passed through the respective measuring chambers;

- milk that flows through the respective measuring chambers is illuminated;

- two-dimensional digital images of illuminated milk that flows through the respective measuring chambers is repeatedly recorded, where said two-dimensional digital images are recorded through a lens system to obtain a spatial resolution better than about 5 microns in said two-dimensional digital images; and

- somatic cell or fat droplet count scores for milk drawn through the respective milk lines are determined from said two-dimensional images by means of digital image processing.

18.    (Currently Amended) An apparatus for counting somatic cells or fat droplets in milk on-line during milking of a milking animal, w h e r e i n :

- a measuring chamber , through which the milk as obtained during said milking of said milking animal is flowed;

- a light source system for illuminating milk that flows through said measuring chamber;

- a two-dimensional camera system  including a lens system, for repeatedly recording <u>about 1000 or more</u> two-dimensional digital images of illuminated milk that flows through said measuring chamber, where said two-dimensional digital images are recorded through said lens system;

- said lens system being a magnification lens system;

- a digital image processing system for determining a somatic cell or fat droplet count score from said <u>about 1000 or more</u> two-dimensional images.

19.    (Previously Presented) The apparatus of claim 18 wherein said at least portion of the milk flowed through said measuring chamber is free from toxic additives.

20.    (Previously Presented) The apparatus of claim 18 wherein said at least portion of the milk flowed through said measuring chamber  is pure milk natural milk, optionally mixed with air, but free from any chemical additives.

21.    (Previously Presented) The apparatus of  claim 18 wherein said two-dimensional camera system provides for a spatial resolution in said two-dimensional digital images better than about 5 microns, preferably better than about 2 microns, more preferably better than about 1 micron, and most preferably better than about 0.5 microns.

22.    (Previously Presented) The apparatus of   claim 18 wherein said measuring chamber has a dimension (t) smaller than about 100 microns, preferably smaller than about 50 microns, and more preferably smaller than about 10 microns, in a direction parallel with the optical axis  of said lens system during said repeated recordings.

23.    (Previously Presented) The apparatus of  claim 18 wherein said digital image processing system is adapted to analyze number, shape, size, structure, density and/or composition of particles found in each image as revealed by reflection and/or transmission properties of the particles as recorded by said camera system.

24.    (Withdrawn) The apparatus of claim 18 wherein said digital image processing system is adapted to use neural networks in determining said somatic cell or fat droplet count score from said two-dimensional images.

25.    (Previously Presented) The apparatus of claim 18 wherein

- said milking of said milking animal is performed by an automated or semi-automated milking system, which comprises a plurality of teat cups , each of which being connected to a respective milk line , which milk lines in turn are connected to a container , wherein, during milking of the teats of said milking animal, said plurality of teat cups are attached to the teats of the milking animal and vacuum  is supplied to said container to draw milk through said milk lines and into said container; and

- said measuring chamber , through which said at least portion of said milk is flowed, is arranged within one of said milk lines .

26.    (Previously Presented) The apparatus of claim 25 wherein said measuring chamber is defined by a light transparent plate mounted in a wall of said one of said milk lines, through which said two-dimensional camera system is adapted to record said two-dimensional images; and an oppositely located substantially flat and parallel surface.

27.    (Previously Presented) The apparatus of claim 26 wherein said measuring chamber is open in directions being parallel with said light transparent plate and said substantially flat surface, and orthogonal to a general direction of the flow of said at least portion of said milk.

28.    (Previously Presented) The apparatus of claim 26 wherein said substantially flat surface is rotatable around an axis being orthogonal to said light transparent plate and said substantially flat surface.

29.    (Previously Presented) The apparatus of claim 26 wherein said substantially flat surface is an end surface of a rod.

30.    (Previously Presented) The apparatus of claim 29 wherein said rod is light transparent to allow for illumination through said rod of said milk that flows through said measuring chamber.

31.    (Previously Presented) The apparatus of claim 25 wherein said container is provided with a plurality of milk output lines; and said apparatus further comprises a pump and regulator system connected to said digital image processing system for pumping said milk drawn through the milk lines and into said container out through one of said plurality of milk output lines depending on said somatic cell or fat droplet count score.

32.    (Previously Presented) The apparatus of claim 25 wherein

- each of said milk lines is provided with a measuring chamber, through which a portion of the milk drawn through the respective milk line is passed;

- said light source system is adapted to illuminate milk that flows through each of said measuring chambers;

- said two-dimensional camera system is adapted to repeatedly record two-dimensional digital images of illuminated milk that flows through each of said measuring chambers; and

- said digital image processing system is adapted to determine a somatic cell or fat droplet count score for milk drawn through each of said milk lines from said two-dimensional images.

33.    (Currently Amended) The apparatus of claim 18 wherein

- said milking of said milking animal is performed by an automated or semi-automated milking system, which comprises a plurality of teat cups, each of which being connected to a respective milk line , wherein, during milking of the teats of said milking animal, said plurality of teat cups are attached to the teats of the milking animal and vacuum  is supplied to said teat cups through said milk lines to draw milk through said milk lines;

- each of said milk lines is provided with a measuring chamber, through which a portion of the milk drawn through the respective milk line is passed;

- said light source system is adapted to illuminate milk that flows through each of said measuring chambers;

- said two-dimensional camera system is adapted to repeatedly record <u>about 1000 or more</u> two-dimensional digital images of illuminated milk that flows through each of said measuring chambers;

- said digital image processing system is adapted to determine a somatic cell

or fat droplet count score for milk drawn through each of said milk lines from said two-dimensional images; and

- a directing means connected to said digital image processing system for directing milk drawn through each of the respective milk lines into a selected one of a plurality of containers depending on the respective somatic cell or fat droplet count score.

34.  (Withdrawn) A milking robot comprising the plurality of teat cups, the plurality of milk lines , the container , and the apparatus for counting somatic cells or fat droplets of claim 25.

35.  (New) The method of claim 1, wherein the magnification lens system is a high-magnification lens system providing a spatial resolution in the digital images of about 0.5 microns or less.

36.  (New) The apparatus of claim 18, wherein the magnification lens system is a high-magnification lens system providing a spatial resolution in the digital images of about 0.5 microns or less.

37.  (New) The method of claim 1, wherein the somatic cells are distinguished from the fat droplets by analyzing at least one of shape, size, structure, density, and composition in the digital images.

38.  (New)  The apparatus of claim 18, wherein the digital imaging processing system is configured to distinguish the somatic cells from the fat droplets by analyzing at least one of shape, size, structure, density, and composition in the digital images.